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Research Article

Preparation and Evaluation of Myoconductive ECG Gel

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ABSTRACT

Hydrogel formulation provides better application property and stability. Hydrogels are the swellable polymeric materials, have been widely investigated as the carrier for drug delivery systems. The hydrogel can be defined as a cross-linked polymeric network which has the capacity to hold water within its porous structure. Conductive gel used in electrocardiography. The electrode gel greatly affects the signals from the skin to electrode. Hydrogel should be greaseless, odourless and non-staining. In addition to getting information about cardiac status, respiratory rate monitoring and ventilator triggering are possible from ECG gel. The gel can be easily removed after use. Hydrogels are the semi-rigid systems in which the movement of the dispersing medium is restricted by an interlacing three-dimensional network of particles or solvated macro-molecules in the dispersed phase. Physical and /or chemical cross-linking may be involved. The interlacing and consequential internal friction is responsible for increased viscosity and the semisolid state. Gels are evaluated by following parameters such as pH, viscosity, spreadability, skin irritation studies, sound speed, electric impendence, sound attenuation , sound impendence frequency.

Key-words: Topical gel, electrical response capacity, drug delivery.

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INTRODUCTION:

Gels are materials where polymer chains form the links of a network immersed in a typically liquid environment. The polymer chains are cross-linked at the microscopic level by chemical bonds or weaker physical bonds; the type of bond is used to label the macroscopic material as a chemical or a physical gel, respectively. The physical bonds can have diverse origins, such as vander Waals interactions or hydrogen bonding, and can involve a complex local structure such as the formation of a small crystalline domain. Because of their significant liquid content (up to 99% liquid by weight), often comparable to conditions in physiological tissue, gels have found various applications, especially in biomedical contents. For example, gels are used as scaffolds in tissue engineering, as systems of sustained drug delivery, as materials for contact lenses, and in many stimuli-sensitive actuators. In the rational design of the materials required for these applications, knowledge and prediction of key properties are crucial. It is therefore highly desirable to have specific models for these materials capable of describing their response to external stimuli[1].

Hydrogels can be designed to change properties (e.g. swelling/collapse or solution-to-gel transitions) in response to externally applied triggers, such as temperature, ionic strength, solvent polarity, electric/magnetic field, light, or small (bio) molecules[2].Hydrogels may be chemically stable or they may degrade and eventually disintegrate and dissolve. They are called 'reversible' or 'physical' gels when the networks are held together by molecular entanglements[3]. The unique physical properties of hydrogels have sparked particular interest in their use in drug delivery applications. Their highly porous structure can easily be tuned by controlling the density of cross-links in the gel matrix and the affinity of the hydrogels for the aqueous environment in which they are swollen. Their porosity also permits loading of drugs into the gel matrix and subsequent drug release at a rate dependent on the diffusion coefficient of the small molecule or macromolecule through the gel network. Indeed, the benefits of hydrogels for drug delivery may be largely pharmacokinetic e specifically that a depot formulation is created from which drugs slowly elute, maintaining a high local concentration of drug in the surrounding tissues over an extended period, although they can also be used for systemic delivery. Hydrogels are also generally highly biocompatible[4].

While the gel achieves the aim of making a good contact, several problems result. It takes up to an hour to apply the gel into EEG caps that use 256 sensors. The gel may diffuse through the hair to create shorts between sensors. It may also dry out overtime, making long term recordings very difficult. Our non-contact sensor avoids ohmic contact with skin altogether and operates by capacitive coupling, capable of measuring ECG signals through hair, or ECG signals through clothing.Hydrophilic gels called hydrogels are cross-linked polymeric networks absorbing large quantities of water without dissolving. Softness, smartness, and the capacity to store water make hydrogels unique materials[5].

MATERIALS AND METHOD:

The chemicals used were Carbopol (934), triethnolamine, propylene glycol, propyl paraben, KCL and Water.

METHOD OF PREPARATION OF GEL: By mixing method

Physical cross-linking:

There has been an increased interest in physical or reversible gels due to relative ease of production and the advantage of not using cross-linking agents. These agents affect the integrity of substances to be entrapped (e.g. cell, proteins, etc.) as well as the need for their removal before application. Careful selection of hydrocolloid type, concentration and pH can lead to the formation of a broad range of gel textures and is currently an area receiving considerable attention, particularly in the food industry[6].

EVALUATION PARAMETERS:

1] Appearance:

The hydrogels formulated were observed for their Visual appearance, colour, texture, feel upon application such as grittiness, greasiness, stickiness, smoothness, stiffness and tackiness.[7]

2] pH:

The pH of the hydrogels was determined by immersing pH meter to a depth 0.5 cm in a beaker containing hydrogels. The determinations were carried out in triplicate and the average of three reading is recorded.[7]

3] Viscosity:

The viscosities of formulated hydrogels were determined using Brook-field viscometer (spindle number LV-61) in triplicate and the average of three reading is recorded.[7]

CONCLUSION:

It can be concluded from the given above information the materials used for preparation of the ECG gels are very effective and are not harmful to the body part. Hence by using this materials we can prepare a gel for recording the safe and quick ECG. By using the evaluation parameter we can check the stability, standard dissolution of the gel.

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REFERENCES:

1] www.Hydrogel.com

2]Prashan T, Kalshetti P, Vivek B Rajendra, deepashree N. Dixit, Pranav P Parekh. Hydrogels as a drug delivery system and applications: A review**.** International Journal of Pharmacy and Pharmaceutical Sciences 2012;4(1):1.

3]Todd R Hoare, Daniel S Kohane. Hydrogels in drug delivery: Progress and challenges. Polymer 2008; 49:1993.

4]Hennink WE, Nostrum C F. Novel crosslinking methods to design hydrogels. Advanced Drug Delivery Reviews 2008; 54: 13–36.

5] Esposito E, Carotta V, Scabbita A. Cutaneous and Transdermal Delivery: Processes and systems of Delivery.1st ed. USA: Marcel Dekker In: Baker GS, Rhodes C (eds). Modern Pharmaceutics,Inc;1996.

6]GanjiFariba and Farahani Ebrahim Vasheghani. Hydrogels in Controlled Drug Delivery Systems. Iranian Polymer Journal 2009;18(1): 80.

7]Gupta G D, Gound R S.Release rate of nimesulide from different gellants. Indian J Pharm Sci 1999; 61: 229-234